REMARKS

Claims 1-14, 17-25 and 27-44 are pending. Claims 15, 16 and 26 have been canceled without prejudice to or disclaimer of the subject matter of the claims. Claims 1, 4, 6, 8, 16, 17, 20, 24, 25, 27, 29, 31, 33 and 37-39 have been amended. Portions of the specification have also been amended for clarity. Applicants respectfully request reconsideration of the application in response to the non-final Office Action.

Claim Rejections – 35 U.S.C. §112

Claims 4, 6, 8, 16-18, 21, 22, 26, 29, 31, 33, 37 and 39 have been rejected under 35 U.S.C. §112, second paragraph, for insufficient antecedent basis for the "PPG," "EDA," "SKT" and "SVM" claim terms. Applicants respectfully traverse the rejection.

The term "PPG" is defined as photoelectric pulse plethysmograph on page 11, line 29, of the specification, "EDA" is defined as electrodermal activity on page 12, lines 3-4, of the specification, "SKT" is defined as skin temperature on page 12, line 2, of the specification, and "SVM" is defined as support vector machine on page 20, line 22, of the specification. For clarity, Applicants have amended claims 1, 4, 6, 8, 17, 24, 29, 31, 33 and 37 to define these terms. Claims 21 and 22 depend from amended claim 1, claim 18 depends from amended claim 17, and claim 39 depends from amended claim 24, providing antecedent basis for the aforementioned claim terms. Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. §112 of claims 4, 6, 8, 17, 18, 21, 22, 29, 31, 33, 37 and 39 be withdrawn.

Claims 16 and 26 have been canceled, thereby rendering the rejection under 35 U.S.C. §112 of claims 16 and 26 moot.

Claim 16 has been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claim 16 has been canceled, thereby rendering the rejection under 35 U.S.C. §112 of claim 16 moot.

In response to the Examiner's request that Applicants further explain the functions of the SVM unit and the subtracter unit, Applicants note that claim 1 has been amended to include, and to more clearly recite, features of canceled claim 16. For example, claim 1, as amended, recites "an emotional state analysis unit, including a feature analysis unit for extracting feature values of the classified biomedical signals input from the biomedical signal measurement module, a subtracter unit for obtaining differences between the extracted feature values from the feature analysis unit and predetermined feature values, and a support vector machine (SVM) unit for classifying the user's emotional state by respective emotions in accordance with the differences of the feature values obtained by the subtracter unit."

The functions of the SVM unit and subtracter unit are described in the specification of the instant application. For example, in one embodiment, feature values can be extracted from biomedical signals detected from the user (e.g., Feature 1 – Feature 4). Meanwhile, feature values corresponding to a normal emotional state of the user (e.g., Feature 1' – Feature 4') can be stored in a subtracter unit 320 as standard feature values, which can be compared to the extracted feature values to determine the user's emotional state. For example, the subtracter unit 320 can calculate a difference between the feature values extracted from the detected biomedical signals (Feature 1 – Feature 4) and the stored, previously determined, feature values for the normal emotional state of the user (Feature 1' – Feature 4'). Then, a SVM classifier 332 can classify the emotional state of the user based on the differences between the feature values output from the subtracter unit 320. For example, the SVM classifier 332 can be configured as a linear separator, which linearly projects and analyzes a non-linear, high-order input space into a feature space, and presents an optimal boundary between the feature values in order to classify respective emotions of the user. The emotion classification results obtained by the SVM classifier can then be output as respective emotion intensities (e.g., 30% stress, 60% sadness, 10% anger). (See, Specification at page 20, line 10 – page 21, line 29). Accordingly, for at least these reasons, Applicants submit that claim 1, as amended, is definite under 35 U.S.C. §112, second paragraph.

Claim Rejections – 35 U.S.C. §102

Claims 1-8, 10, 11 and 15 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 6,190,314 to Ark *et al.* ("Ark"). Applicants respectfully traverse the rejection for at least the following reasons.

Claim 1 has been amended to include, and to more clearly recite, features of canceled claims 15 and 16. Claim 1 recites a mobile device with an input unit, a display unit, a memory unit and a central control unit, the mobile device comprising:

> a biomedical signal measurement module for detecting biomedical signals from a user's body, classifying the detected biomedical signals by respective signals and outputting the classified signals; and

> a health care module for analyzing an emotional state and physical condition of the user based on the classified signals input from the biomedical signal measurement module and physical information of the user, the health care module comprising:
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> an emotional state analysis unit, including a feature analysis unit for extracting feature values of the classified biomedical signals input from the biomedical signal measurement module, a subtracter unit for obtaining differences between the extracted feature values from the feature analysis unit and predetermined feature values, and a support vector machine (SVM) unit for classifying the user's emotional state by respective emotions in accordance with the differences of the feature values obtained by the subtracter unit, and
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> a physical condition analysis unit for analyzing the user's physical condition based on the classified biomedical signals input from the biomedical signal measurement module and the user's physical information.

Applicants respectfully disagree that Ark teaches a physical condition analysis unit for analyzing the user's physical condition based on the classified biomedical signals input from the biomedical signal measurement module and the user's physical information, as recited in amended claim 1. (See, Office action at page 4). While Ark describes using sensors on a computer input device to generate physiological signals for a user, and correlating the physiological signals to one or more emotions, nowhere does Ark describe analyzing the user's physical condition (e.g., body fat percentage) based on the biomedical signals (e.g., body impedance value) and the user's physical information (e.g., the user's height, weight, etc.). (See, Specification at page 22, lines 17-22, Ark at col. 2, lines 12-50).

Moreover, as described herein, amended claim 1 includes, and more clearly recites, features of canceled claims 15 and 16. At a minimum, Applicants submit that Ark does not teach, and is not purported to teach, the "support vector machine (SVM) unit for classifying the user's emotional state by respective emotions in accordance with the differences of the feature values obtained by the subtracter unit," recited in amended claim 1.

Thus, because Ark does not describe each and every element as set forth in claim 1, as amended, Applicants submit that Ark does not anticipate claim 1. (See, MPEP at §2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). Accordingly Applicants respectfully request that the rejection under 35 U.S.C. §102(b) of independent claim 1, and of claims 2-8, 10 and 11, which depend therefrom, be withdrawn. Claim 15 has been canceled, thereby rendering the rejection under 35 U.S.C. §102(b) of claim 15 moot.

Claims 1, 2, 9 and 12-44 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 7,261,690 to Teller *et al.* ("Teller"). Applicants respectfully traverse the rejection for at least the following reasons.

Applicants submit that Teller does not teach "a support vector machine (SVM) unit for classifying the user's emotional state by respective emotions in accordance with the differences of the feature values obtained by the subtracter unit," as recited in amended claim 1. (See Office action at page 8). Teller describes a Health Manager utility through which a central monitoring unit 30 provides data to a user generated from data it collects or generates, such as data indicative of, and derived from, physiological parameters generated by a sensor device 10 and data input by the user. (Teller at col. 16, lines 48-63). A Mind Centering category is designed to help users monitor parameters relating to time spent engaging in certain activities which allow the body to achieve a state of profound relaxation while the mind becomes focused, and is based upon both data input by the user and data sensed by the sensor device 10. (Teller at col. 19, lines 31-44). Teller describes that a Mind

Centering Health Index piston level is preferably calculated with respect to a suggested healthy daily routine that includes participating each day in an activity that allows the body to achieve profound relaxation while the mind stays highly focused for at least fifteen minutes, and that parameters utilized in the calculation of the relevant piston level include the amount of time spent in a mind centering activity and the percent change in skin temperature, heart rate, respiration rate, heat flow or GSR, as sensed by sensor device 10, compared to a baseline which is an indication of the depth or quality of the mind centering activity. (Teller at col. 19, lines 31-44).

Thus, while Teller describes calculating a depth or quality of a mind centering activity based on percent changes in sensed physiological parameters, nowhere does Teller teach "a support vector machine (SVM) unit for classifying the user's emotional state by respective emotions in accordance with the differences of the feature values obtained by the subtracter unit," as recited in amended claim 1 (emphasis added).

Moreover, with respect to dependent claims 12, 35 and 36, Applicants submit that Teller does not teach "correcting user-to-user variation of the biomedical signals detected from the user's body." The specification of the instant application explains that user-to-user variation in biomedical signals detected through a sensor unit 150 largely changes depending on response sensitivity and measuring environment. For example, if a nickel electrode is employed in an EDA sensor 131 of a skin resistance sensor 130, user-to-user variation in a DC value of the skin resistance detected through the nickel electrode is increased. Accordingly, it is necessary to correct user-to-user variation in skin resistance during an initialization stage of measurement. To this end, a sensor control unit 170 of a biomedical signal measurement module 100 can correct user-to-user variation in skin resistance by decreasing or increasing the gain of an amplifier 133 according to a voltage value output from the EDA sensor 131 through the amplifier 133. (See, Specification at page 23, line 27 to page 24, line 25).

Teller, on the other hand, describes that, depending upon the nature of the signal generated by a sensor 12, the signal can be sent through an amplifier 14, conditioning circuit 16, and analog-to-digital converter 18, before being sent to a microprocessor 20. For example, where sensor 12 generates an analog signal in need of amplification and filtering, that signal can be sent to amplifier 14, and then on to conditioning circuit 16, which may, for example, be a band pass filter. The amplified and conditioned analog signal can then be transferred to analog-to-digital converter 18, where it is converted to a digital signal. The digital signal is then sent to microprocessor 20. Alternatively, if sensor 12 generates a digital signal, that signal can be sent directly to microprocessor 20. (Teller at col. 9, lines 52-67). Thus, while Teller describes processing sensor-generated signals, nowhere does Teller teach correcting user-to-user variation of the biomedical signals detected from the user's body, in accordance with claims 12, 35 and 36.

Because Teller does not describe each and every element as set forth in claim 1, as amended, Applicants submit that Teller does not anticipate claim 1. Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. §102(e) of independent claim 1, and of claims 2, 9, 12-14 and 17-23, which depend therefrom, be withdrawn. Claims 15 and 16 have been canceled, thereby rendering the rejection under 35 U.S.C. §102(e) of claims 15 and 16 moot. Further, for reasons analogous to those presented for claim 1, Applicants submit that Teller does not anticipate claim 24, as amended. Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. §102(e) of independent claim 24, and of claims 25 and 27-44, which depend therefrom, be withdrawn. Claim 26 has been canceled, thereby rendering the rejection under 35 U.S.C. §102(e) of claim 26 moot.

Conclusion

It is believed that this Amendment does not require additional fees. However, if additional fees are required for any reason, please charge Deposit Account No. 02-4800 the necessary amount.

In the event that there are any questions concerning this paper, or the application in general, the Examiner is respectfully urged to telephone Applicants' undersigned representative so that prosecution of the application may be expedited.

Respectfully submitted,

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